

Theory of Machines MCQ Question Answer

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Question: 1. The type of gears used to connect two non parallel and non intersecting shafts is

- Option A. Spur gear
- Option B. Helical gear
- Option C. Bevel gear
- Option D. Spiral gear

Question: 2. The primary unbalanced force due to inertia of reciprocating parts in a reciprocating engine is given by (where m = Mass of reciprocating parts, ω = Angular speed of crank, r = Radius of crank, θ = Angle of inclination of crank with the line of stroke, and n = Ratio of the length of connecting rod to radius of crank)

- Option A. $m.\omega^2.r \sin\theta$
- Option B. $m.\omega^2.r \cos\theta$
- Option C. $m.\omega^2.r (\sin 2\theta/n)$
- Option D. $m.\omega^2.r (\cos 2\theta/n)$

Question: 3. In order to double the period of a simple pendulum, the length of the string should be

- Option A. Halved
- Option B. Doubled
- Option C. Quadrupled
- Option D. None of these

Question: 4. In steady state forced vibrations, the amplitude of vibrations at resonance is _____ damping coefficient.

- Option A. Equal to
- Option B. Directly proportional to
- Option C. Inversely proportional to
- Option D. Independent of

Question: 5. The ratio of height of Porter governor (when length of arms and links are equal) to the height of Watt's governor is (where m = Mass of the ball, and M = Mass on the sleeve)

- Option A. $m/(m + M)$
- Option B. $M/(m + M)$
- Option C. $(m + M)/m$
- Option D. $(m + M)/M$

Question: 6. Which of the following mechanism is an approximate straight line motion mechanism?

- Option A. Watt's mechanism
- Option B. Grasshopper mechanism

Option C. Robert's mechanism

Option D. All of these

Question: 7. The height of a Watt's governor is

Option A. Directly proportional to speed

Option B. Directly proportional to $(\text{speed})^2$

Option C. Inversely proportional to speed

Option D. Inversely proportional to $(\text{speed})^2$

Question: 8. The direction of Coriolis component of acceleration is the direction

Option A. Of relative velocity vector for the two coincident points rotated by 90° in the direction of the angular velocity of the rotation of the link

Option B. Along the centripetal acceleration

Option C. Along tangential acceleration

Option D. Along perpendicular to angular velocity

Question: 9. The total number of instantaneous centres for a mechanism consisting of n links are

Option A. $n/2$

Option B. n

Option C. $n - 1$

Option D. $n(n - 1)/2$

Question: 10. The tendency of a body to resist change from rest or motion is known as

Option A. Mass

Option B. Friction

Option C. Inertia

Option D. Resisting force

Question: 11. A thin circular disc is rolling with a uniform linear speed, along a straight path on a plane surface. Which of the following statement is correct in this regard?

Option A. All points of the disc have the same velocity

Option B. The centre of the disc has zero acceleration

Option C. The centre of the disc has centrifugal acceleration

Option D. The point on the disc making contact with the plane surface has zero acceleration

Question: 12. A Hartnell governor has its controlling force (F_c) given by $F_c = ar + b$, where r is the radius of rotation and a and b are constants. The governor becomes isochronous when

Option A. a is +ve and $b = 0$

Option B. $a = 0$ and b is +ve

Option C. a is +ve and b is -ve

Option D. a is +ve and b is also +ve

Question: 13. A completely constrained motion can be transmitted with.

- Option A. 1 link with pin joints
- Option B. 2 links with pin joints
- Option C. 3 links with pin joints
- Option D. 4 links with pin joints

Question: 14. The locus of a point on a thread unwound from a cylinder will be

- Option A. A straight line
- Option B. A circle
- Option C. Involute
- Option D. Cycloidal

Question: 15. In a mechanism, usually one link is fixed. If the fixed link is changed in a kinematic chain, then relative motion of other links

- Option A. Will remain same
- Option B. Will change
- Option C. Could change or remain unaltered depending on which link is fixed
- Option D. Will not occur

Question: 16. The coriolis component of acceleration exists whenever a point moves along a path that has

- Option A. Linear displacement
- Option B. Rotational motion
- Option C. Gravitational acceleration
- Option D. Tangential acceleration

Question: 17. When the load on the engine increases, it becomes necessary to increase the supply of working fluid and when the load decreases, less working fluid is required. The supply of the working fluid to the engine is controlled by a

- Option A. D-slide valve
- Option B. Governor
- Option C. Meyer's expansion valve
- Option D. Flywheel

Question: 18. In a circular arc cam with roller follower, the acceleration in any position of the lift will depend only upon

- Option A. Total lift, total angle of lift, minimum radius of cam and cam speed
- Option B. Radius of circular arc, cam speed, location of centre of circular arc and roller diameter
- Option C. Mass of cam follower linkage, spring stiffness and cam speed
- Option D. Total lift, centre of gravity of the cam and cam speed

Question: 19. The effort of a Porter governor is equal to (where c = Percentage increase in speed, m = Mass of ball, and M = Mass on the sleeve)

- Option A. $c (m - M) g$

Option B. $c(m + M)g$

Option C. $c/(m + M)g$

Option D. $c/(m - M)g$

Question: 20. A spring controlled governor is said to be unstable when the controlling force

Option A. Increases as the radius of rotation decreases

Option B. Increases as the radius of rotation increases

Option C. Decreases as the radius of rotation increases

Option D. Remains constant for all radii of rotation

Question: 21. The equation of free vibrations of a system is $(d^2x/dt^2) + 36\pi^2x$, its natural frequency is

Option A. 3 Hz

Option B. 3π Hz

Option C. 6 Hz

Option D. 6π Hz

Question: 22. In a mechanism, the fixed instantaneous centres are those centres which

Option A. Remain in the same place for all configurations of the mechanism

Option B. Vary with the configuration of the mechanism

Option C. Moves as the mechanism moves, but joints are of permanent nature

Option D. None of the above

Question: 23. The centre of gravity of a coupler link in a four bar mechanism will experience

Option A. No acceleration

Option B. Only linear acceleration

Option C. Only angular acceleration

Option D. Both linear and angular acceleration

Question: 24. The critical speed of a shaft depends upon its

Option A. Mass

Option B. Stiffness

Option C. Mass and stiffness

Option D. Stiffness and eccentricity

Question: 25. Kinematic pairs are those which have two elements that

Option A. Have line contact

Option B. Have surface contact

Option C. Permit relative motion

Option D. Are held together

Question: 26. Two systems shall be dynamically equivalent when

- Option A. The mass of two are same
- Option B. C.G. of two coincides
- Option C. M.I. of two about an axis through e.g. is equal
- Option D. All of the above

Question: 27. The two parallel and coplanar shafts are connected by gears having teeth parallel to the axis of the shaft. This arrangement is known as

- Option A. Spur gearing
- Option B. Helical gearing
- Option C. Bevel gearing
- Option D. Spiral gearing

Question: 28. In full depth involute system, the smallest number of teeth in a pinion which meshes with rack without interference is

- Option A. 12
- Option B. 16
- Option C. 25
- Option D. 32

Question: 29. When a shaking force is transmitted through the springs, damping becomes detrimental when the ratio of its frequency to the natural frequency is greater than

- Option A. 0.25
- Option B. 0.5
- Option C. 1
- Option D. 2

Question: 30. Efficiency of a screw jack is given by

- Option A. $\tan (\alpha + \phi) / \tan \alpha$
- Option B. $\tan \alpha / \tan (\alpha + \phi)$
- Option C. $\tan (\alpha - \phi) / \tan \alpha$
- Option D. $\tan \alpha / \tan (\alpha - \phi)$

1	D	
2	B	
3	C	
4	C	
5	C	
6	D	
7	D	
8	A	
9	D	
10	C	
11	B	
12	A	
13	D	
14	C	
15	A	
16	B	
17	B	
18	A	
19	B	
20	C	
21	A	
22	A	
23	D	
24	C	
25	C	
26	D	
27	A	
28	D	
29	D	
30	B	